

SCIENCE PROJECT OPTIONS

1. Traditional Science Fair - Design and conduct a scientific investigation. Create a display explaining your experiment.

2. Demonstration of a Scientific Principle - Make and use a model of demonstrate a scientific principle (Ohm's Law Law, Newton's Laws, etc). Write a paper explaining the scientific principle.

*** 3. Scientific Collection** - Identify and mount 15 -20 specimens from a group of related-living or non-living natural things (insects, tree twigs, animal tracks, rocks/minerals, etc.). Original photographs of specimens may be used in place of actual specimens. A brief written description of each specimen should be included.

*** 4. Scientific Illustration** - Create a portfolio of drawings that illustrate a concept in science. Drawings might be of flower parts, animal anatomy, ecological zones, insects, etc. Drawings should be labeled.

5. Make a Scientific Instrument - Research, construct, and demonstrate the use of a scientific instrument (such as a telescope, microscope, barometer, etc.). Include a brief research paper describing the history of the instrument and how the instrument works.

*** 6. Multimedia Verbal**- Create a multimedia computer slide presentation on a specific science topic or concept using a school-licensed multimedia program (Power Point) with verbal presentation (21 student cap).

*** 7. Multimedia Recorded** - Create a multimedia computer slide presentation on a specific topic or concept using a school-licensed multimedia program (PowerPoint) with a recorded presentation.

8. Invention - Design and create a new invention that solves a problem or makes a task easier to complete. Write a brief research paper describing where the idea came from and the steps involved in creating the invention.

9. Video Documentary - Create a 5 - 10 minute video documentary that relates to some aspect of science. The video project should include a written outline and a bibliography. The resulting video must be the work of the students. No professional help should be solicited.

***10. Website** - Create an eight page website on a specific topic or concept using a school-licensed program (FrontPage).

*** No partners on these options**

Student Name: _____

Science Fair

1. **Paper**: The paper should be a detailed description of the project. It should contain these sections:
 - **Purpose** – Why did you wish to do the study? What did you hope to find out?
 - **Hypothesis** – Predict the results of your experiment before beginning. It does not matter if your hypothesis ends up being supported by your experiment. It only matters that your hypothesis is clearly stated and the experiment is designed to test the hypothesis.
 - **Procedure** – How will you do your experiment? Test only one variable. Use a control group for comparison. Make sure your procedure is well-planned and approved before beginning.
 - **Results** – What measurements did you take? Organized the data into graphs, tables, or charts.
 - **Conclusion** – Do your results support your hypothesis? What did you learn from your experiment?
 - **Bibliography** – This lists all the sources you consulted during this study (at least 3 references, one from book).
2. **Display Board**: The display presents what was done in the study. It contains a clear and concise summary of each of the elements mentioned above.
3. **Interview**: Each student will be interviewed by judges. The student should be prepared to explain in words each of the elements described above.

<i>Completeness</i>	<i>Points Possible</i>	<i>Points Received</i>
Project has a purpose, hypothesis, procedure, results, conclusion, and bibliography that are typed.	20	
Has a project board that is neat and organized in a logical sequence.	10	
Bibliography (MLA format)	20	
<i>Scientific Value</i>		
Hypothesis answers the purpose.	20	
Results are in chart and/or graph form and are easy to understand.	50	
Conclusion relates to hypothesis (wraps up the experiment)	50	
Display board is creative	20	
Interview	10	
<i>Total</i>	200	

Student Name(s): _____ / _____

Scientific Collection

Making a collection is an interesting way to learn more about a particular topic in science. A good quality collection will last for years and be an object of interest to many people.

Requirements: Display Board or Case

1. Choose a group of objects related to science that you would like to collect (insects, trees of Colorado, plaster casts of animal tracks, rocks and minerals, fossils, etc.) **Original** photographs (**not downloaded from the Internet**) of specimens may be used if collecting actual specimens would be impractical (trees of Colorado for example).
2. Get approval from your science teacher before beginning your collection.
3. Do research about the specimens you are collecting (bibliography, MLA format, at least 3 references, one from book).
4. Identify and neatly mount 15-20 specimens on poster board or similar material for display.
5. Beneath each specimen write a brief but informative description of the specimen.
6. Give a 5 - 10 minute oral presentation in which you explain your collection.

Collection	Points Possible	Points Received
Specimens related to each other	20	
Specimens accurately labeled	20	
Specimens of good quality	15	
Specimens neatly mounted and arranged	15	
Specimen Description		
Accurate, detailed information	25	
Spelling/grammar/punctuation	15	
Neatness	15	
Bibliography (MLA format)	20	
Oral Presentation		
Demonstrates thorough knowledge of specimens	30	
Explains collection process	15	
Answers questions effectively	10	
Total	200	

Scientific Illustration

Detailed and accurate drawings are an important part of any science textbook or scientific article. Good scientific illustration requires not only artistic talent, but knowledge of scientific concepts as well.

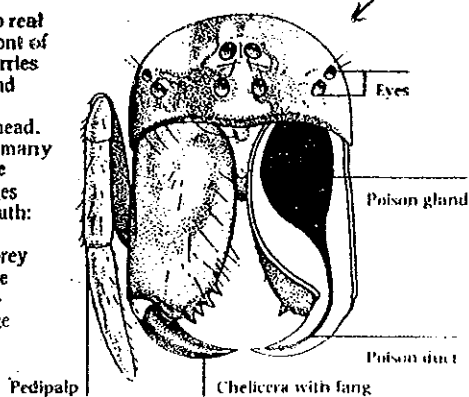
1. Choose a topic that you would like to illustrate (mammals of Colorado, muscles of the human skeleton, insect stages, ecological zones of Colorado, etc.).
2. Discuss your topic with your science teacher to get approval.
3. Research your topic to ensure your drawings are accurate and include 3 references typed in MLA format (bibliography, at least 3, one book reference).
4. On **plain white paper** begin rough drafts for each drawing.
5. Complete 10 main drawings. Main drawings are whole page pictures that demonstrate your topic.
6. Complete 15 supporting drawings. A supporting drawing is a small drawing that shows a concept or detail related to a main drawing.
7. Write accurate and informative descriptions for the final and supporting drawings.

<i>Completeness</i>	<i>Points Possible</i>	<i>Points Received</i>
All required drawings presents	40	
Each drawing has a written description	20	
Bibliography (MLA format, 3 references)	20	
<i>Scientific Value</i>		
Drawings are related by theme or topic	20	
Written descriptions are related to drawings and are informative	30	
Descriptions are neat and accurate	20	
Drawing are neat detailed and accurate	50	
Total	200	

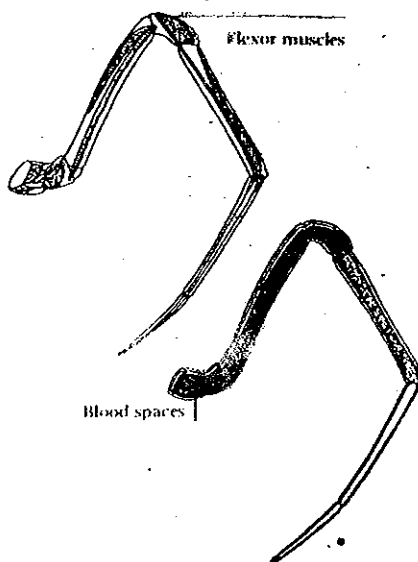
Student Name: _____

SUPPORTING DRAWINGS

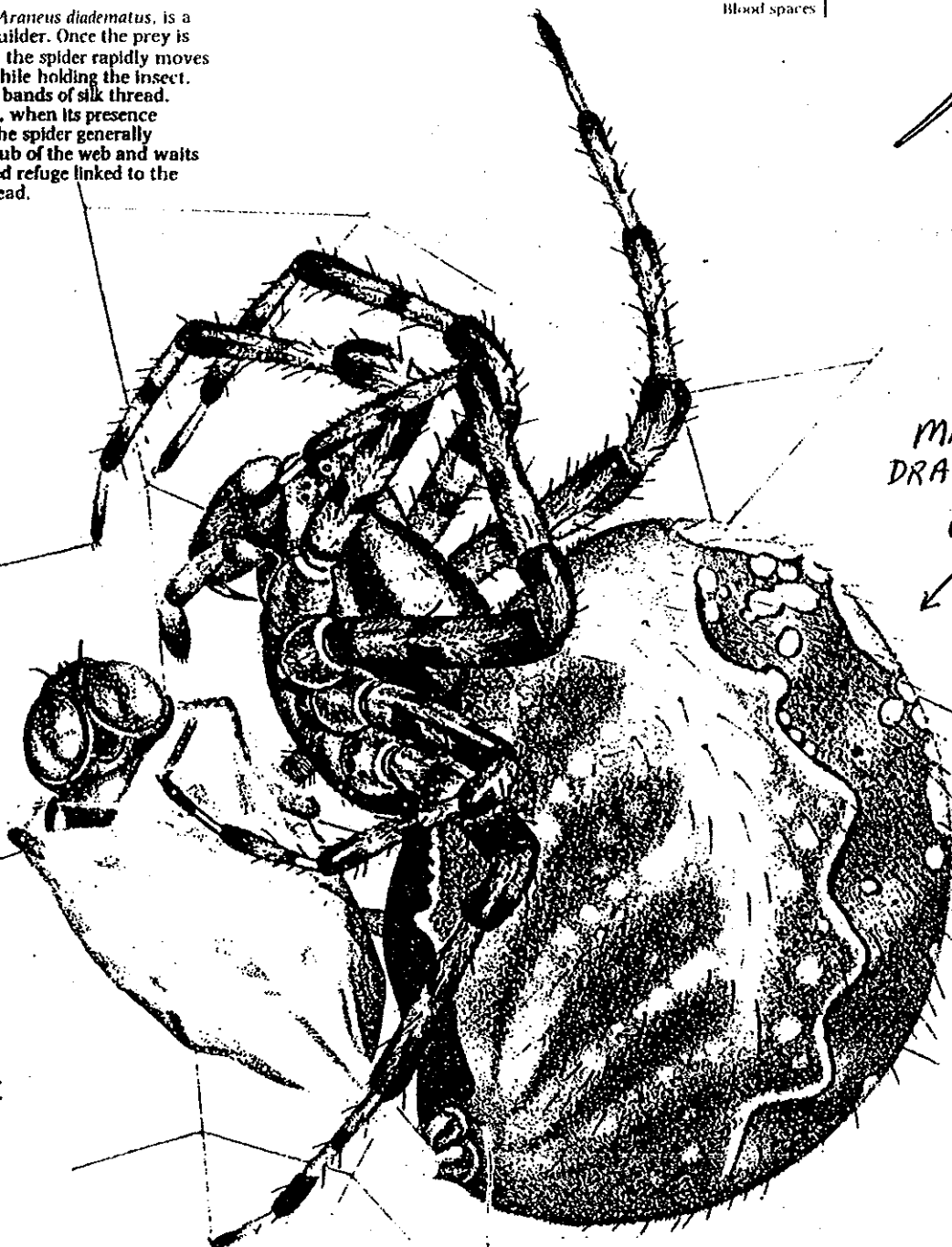
Spiders have no real head but the front of the forebody carries sense organs and mouth, and so functions as a head. It may have as many as 8 eyes. There are 4 appendages around the mouth: 2 pedipalps for manipulating prey and 2 chelicerae with fangs connected to a large poison gland.



Two different systems are used for bending and straightening the legs of spiders. To bend the leg, small muscles across the joints contract. The hollow centre of each leg connects to blood-filled spaces in the forebody: muscle contractions in the forebody force fluid into the leg to extend it.



The garden spider, *Araneus diadematus*, is a common orb web builder. Once the prey is trapped by the web, the spider rapidly moves over, bites it and, while holding the insect, wraps it up in wide bands of silk thread. During the daytime, when its presence might be obvious, the spider generally leaves the central hub of the web and waits nearby in a sheltered refuge linked to the web by a signal thread.



MAJOR
DRAWING

Flying insects and a wide range of invertebrates living on or under the ground fall prey to spiders. The largest species, such as the bird-eating spider of Brazil with a body length of 3.5 in (9 cm), catch small mammals and nestling birds.

Scientific Principle

1. Choose a scientific principle you would like to demonstrate.
2. Research your topic. Include bibliography (MLA format, at least 3 references, one book).
3. Design a way to demonstrate the scientific principle. Submit your plan to your teacher before practicing the demonstration.
4. Practice your demonstration to make sure it works.
5. Write a 1-2 page paper explaining how the demonstration shows a scientific principle.
6. Present the demonstration.

<i>Demonstration</i>	<i>Points Possible</i>	<i>Points Received</i>
Clearly demonstrates a scientific principle	50	
Oral Presentation		
Clearly explains scientific principle	50	
Speaks clearly with appropriate volume	15	
Answers questions effectively	15	
Paper		
Clearly explains how demonstration show a scientific principle	25	
Discusses history of principle	10	
Bibliography (MLA format)	20	
Correct grammer/spelling/punctuation	10	
Neatness of appearance	5	
Total	200	

Student Name(s): _____ / _____

DEMONSTRATIONS

How heat is transmitted
An energy-efficient home
What makes a hot air balloon rise?
Expansion of solids, liquids & gases when heated
How a thermostat works
How a toaster works
The steam engine
The periscope
Kaleidoscopes
How binoculars work
How a microscope works
How a telescope works
What makes rainbows?
Different types of mirrors
Lenses and what they do
How a camera works
How polaroid glasses work
What causes light to bend?
How photocells work
How a prism works
The pinhole camera
The Doppler effect
What causes echoes
How a record player works
How an electric motor works
How a generator works
Batteries, how they work
The telegraph
What is a transformer?
What is a transistor?
Electronic components and their functions
Hydroelectric power
The series circuit and the parallel circuit
How airplanes fly
How a wing works
Hero's engine
How rockets fly
Looping rollercoasters - how they work
How a canal lock works
Primitive clocks
Distillation
Solar still
Water filtration
pH and how to measure it
Acids, bases and pH
How elements combine to make compounds
Capillary action
Radioactivity and Geiger counters

The sextant (or quadrant)
What is density?
What is surface tension?
Weather forecasting
How a barometer works
Cloud chamber
Effects of air pressure
Fermentation
Osmosis
Phases of the moon (working model)
Eclipses
How a geiser works
Harvesting the wind with windmills
How clouds form
Different types of earthquake faults
Sedimentation
How a sundial works
How does the human heart work? (model)
The circulatory system
The ear
Tooth decay
Why a fish has fins
Bird wings, how they work
Photosynthesis
Hydroponics
The action of yeast in bread
How yogurt is made
How cheese is made
Paper recycling
Aluminum recycling
Glass recycling
Oil wells - how they work
The submarine

Scientific Instrument

Making a scientific instrument is a good way to learn about how a particular instrument works and the scientific principles that it demonstrates.

1. Choose a scientific instrument you would like to make.
2. Discuss our choice with your science teacher for approval.
3. Research your instrument. Include bibliography (MLA format, at least 3 references, one book).
4. Build your instrument. Label important parts.
5. Write a 1-2 page paper describing the history of your instrument, how is/ was made, and how it works (include a bibliography).
6. Demonstrate your instrument to the judges.

<i>Instrument</i>	<i>Points Possible</i>	<i>Points Received</i>
Performs function if was designed to perform (Does it work)	30	
Labeled with necessary or useful information (units, instructions, parts)	30	
Constructed from basic materials	30	
<i>Presentation</i>		
Describes process used to make the instruments	15	
Explains how the instrument works	15	
Demonstrates the use of the instrument	15	
Discusses the history of how the instrument was made	10	
Discusses limitations/accuracy of the instrument	5	
<i>Paper</i>		
Describes how the instrument was made	10	
Describes how the instrument works	10	
Discusses history of the instrument	10	
Bibliography (MLA format)	20	
<i>Total</i>	200	

Student Name(s): _____ / _____

Multimedia Verbal

Creating a multimedia presentation is an excellent way to demonstrate, teach, and excite people about something of interest related to science. A good presentation will use several different media such as graphics, text, and sound to convey information. These different elements can be combined in a way that is informative, interesting, and fun to view.

Requirements for Multimedia Option: Student must have the following.

- ✱ 2003 Microsoft PowerPoint at Home
- ✱ Jump Drive
- ✱ Recommend High Speed Internet

1. Choose a science topic that is of interest to you. Some ideas you might consider are:
 - Predators of Africa
 - Weather of Colorado
 - Viruses
2. Research your topic. List your sources in bibliography form (MLA format, at least 6 references, one from a book).
3. Develop a graphic organizer of how you want to organize and present your information.
4. Find photographs and sounds for your presentation (sounds can't be from power point menu and photographs can't be clip art).
5. Produce your final presentation.

Verbal Presentation (Cap of 21)

<i>Content</i>	<i>Points Possible</i>	<i>Points Received</i>
Clearly presents a scientific concept in detail	60	
Organized in a logical way	20	
Bibliography (MLA format)	20	
<i>Effective use of multimedia</i>		
15 or more slides	30	
Slides are easy to view/read	20	
At least 8 photographs (not clip art)	20	
At least 3 sounds (not Power Point)	5	
Verbal Presentation (Less than 7 minutes)	20	
1 movie or graph or chart	5	
<i>Total</i>	<i>200</i>	

Student Name: _____

Multimedia Recorded

Creating a multimedia presentation is an excellent way to demonstrate, teach, and excite people about something of interest related to science. A good presentation will use several different media such as graphics, text, and sound to convey information. These different elements can be combined in a way that is informative, interesting, and fun to view.

Requirements for Multimedia Option: Student must have the following.

- ※ 2003 Microsoft PowerPoint at Home
 - ※ Jump Drive
 - ※ Microphone
 - ※ Recommend High Speed Internet
6. Choose a science topic that is of interest to you. Some ideas you might consider are:
 - Predators of Africa
 - Weather of Colorado
 - Viruses
 7. Research your topic. List your sources in bibliography form (MLA format, at least 6 references, one from a book).
 8. Develop a graphic organizer of how you want to organize and present your information.
 9. Find photographs and sounds for your presentation (sounds can't be from power point menu and photographs can't be clip art).
 10. Produce your final recorded presentation.

Recorded Presentation

<i>Content</i>	<i>Points Possible</i>	<i>Points Received</i>
Clearly presents a scientific concept in detail	60	
Organized in a logical way	20	
Bibliography	20	
<i>Effective use of multimedia</i>		
15 or more slides	30	
Slides are easy to view/read	20	
At least 8 photographs (not clip art)	20	
At least 3 sounds (not Power Point)	5	
Recorded Presentation (less than 7 minutes)	20	
1 movie or graph or chart	5	
<i>Total</i>	<i>200</i>	

Student Name: _____

Invention

While making an invention rarely results in fame and fortune, it is a good way to combine scientific principles and creative problem solving resulting in a unique product.

1. Think of a practical problem you would like to solve or a task you would like to make easier.
2. Think of a device or tool that ***does not yet exist*** that you could make that would solve problem or make world a better place.
3. Discuss your choice with your science teacher for approval.
4. Research your problem. Include bibliography (MLA format, at least 2 references).
5. Build your invention. Label important parts.
6. Write a 1-2 page paper (Owner's Manual) describing how you got the idea for your invention, how it is made, and how it works.
7. Demonstrate your invention to the judges.

<i>Invention</i>	<i>Points Possible</i>	<i>Points Received</i>
Performs function it was designed to do	30	
Labeled with necessary or useful information (units, instructions, parts)	30	
Constructed from basic materials	20	
<i>Presentation</i>		
Describes process used to make the invention	15	
Explains how the invention works	15	
Demonstrates the use of the invention	15	
Discusses the limitations/usefulness of the invention	15	
<i>Owner's Manual</i>		
Describes how the invention was made	20	
Describes the limitations/usefulness of the invention	20	
Owner's Manual (Directions)	20	
<i>Total</i>	200	

Student Name(s): _____ / _____

Video Documentary

Writing and filming a video documentary gives you an opportunity to be creative while producing something of scientific value. A good quality video will not only be interesting, but will provide valuable scientific information as well.

REQUIREMENTS:

- Video must be on a CD/DVD/Full Size VHS/Jump Drive/Portable Hard Drive
- Must have a Camcorder

1. Choose a topic related to some aspect of science. A few suggestions to get you thinking are:
 - Predators of Africa
 - The invention of the Telephone
 - An interview with Einstein
 - Mammals of the Pikes Peak Region
 - Geology of the Great Sand Dunes
2. Research your topic. List your sources in a bibliography MLA format (at least 4 references, one from a book).
3. Write an outline/graphic organizer for your video project.
4. Produce your video. The final work must be the work of the student!
Do **NOT** use professional assistance with the production of the video.

<i>Content</i>	<i>Points Possible</i>	<i>Points Received</i>
Clearly presents a scientific concept in detail	65	
Organized in a logical way	20	
Bibliography (MLA format)	20	
5 - 10 minute presentation	10	
<i>Effective use of video as a means of communication</i>		
Speech is easily understood	20	
Images in focus, adequate lighting	20	
Camera movement is smooth	15	
Transitions (scene changes) smooth	15	
Hold viewer's interest	15	
<i>Total</i>	<i>200</i>	

Student Name(s): _____ / _____

Website Option

Creating a website is an excellent way to demonstrate, teach, and excite people about something of interest related to science. A good website is constructed in a logical and user friendly way, all links work, uses several different forms of media such as graphics, text, and informational search engines to convey information, and is fun to use.

Requirements for Website Option: Student must have the following.

- Webpage Software at Home
 - Jump Drive
 - Recommend High Speed Internet
1. Choose a science topic that is of interest to you. Some ideas you might consider
 - Predators of Africa
 - Weather of Colorado
 2. **Research your topic.** Include bibliography (MLA format, at least 6 references, one book).
 3. **Develop a Graphic Organizer** of how you want to organize and present your information.
 4. **Photographs for all pages.**
 5. **Produce your final presentation.**
 6. **8 Website pages include the following:**
 - Table of Contents and History/Description Page
 - Information pages (4 or more)
 - Resource page
 - Quiz/Activity page
 - Bibliography page

<i>Content</i>	<i>Points Possible</i>	<i><u>Points Received</u></i>
Clearly presents a scientific concept in detail (Information pages)	60	
All pages are linked	30	
Bibliography (MLA format)	20	
<i>Effective use of multimedia</i>		
Minimum of 8 pages	20	
Pages are user friendly	20	
At least 8 photographs (not clip art) at least 1 per page	20	
Quiz/Activity page	10	
Resource (Search Engine) Page with at least 4 resources	10	
1 movie clip or graph or chart	10	
Total	200	

Student Name: _____